

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant : Nemoto, Shigeru  
Appl. No. : 10/692,090  
Filed : October 23, 2003  
For : SYRINGE BARREL WITH  
ROUGHEND SURFACE  
Examiner : DeSanto, Matthew F.  
Group Art Unit : 3763

**DECLARATION UNDER 37 C.F.R §1.132**

**Mail Stop Amendment**  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Dear Sir:

1. This Declaration is being submitted to explain theoretically that the syringe barrel disclosed by Botich, USP 5,407,431, does not achieve the effect of the present invention.
2. I am an employee of Nemoto Kyorindo Co., Ltd., and am familiar with the specification and prosecution history.
3. I have extensive experience in the field of mechanical engineering for many years. My Curriculum Vitae is attached herewith as Appendix A.
4. Theoretically, static friction force (F) is expressed by the following equation (1).

$$F = \mu N \quad (1)$$

wherein, F denotes the maximum static friction force,  $\mu$  denotes the coefficient of friction and N denotes the normal force to the contact surface. While the mechanism of friction force has not yet been fully solved, it is believed either engagement of concave-convex portion of the two surfaces or cohesive effect of the two surfaces.

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It is known that the coefficient of friction, and therefore the maximum static friction force, does not depend on the apparent contacting surface area. Even if the contacting surface area increases or decreases, the maximum static friction force stays the same value. On the other hand, if the contacting surface is roughened, the maximum static friction force (F) increases because the coefficient of friction ( $\mu$ ) increases. The increase of  $\mu$  is accounted for either the engagement effect or cohesive effect.

In the syringe barrel disclosed by Botich, USP 5,407,431, the flange 79 has grooves 83 or knurling. The size of grooves or knurling are considered to be about 1 mm to 3 mm in width from FIG. 1. When the flange 79 is brought into contact with the flange insertion groove, the maximum static friction force is believed to be almost the same the value as observed for the flange having flat surface. This is because the grooves or knurling of about 1 to 3 mm size in width do not effect the change in the coefficient of friction ( $\mu$ ). Therefore, if the syringe barrel disclosed by Botich or that having similar structure is used with the injector having the cylinder holder with flange insertion groove, the same result will be obtained as those shown as comparative examples in Table 2 on page 28 of the present application.

5. In conclusion, the claimed invention possesses unexpected advantages and the result is not predictable from the cited references.

6. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful, false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or patent issuing therefrom.

Dated: May 9, 2008

By: 矢澤 亜希夫  
Akio YAZAWA

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### Appendix A

1. I was born on February 28, 1976. I graduated from the Department of Mechanical Engineering, College of Engineering of Kanto Gakuin University on March 31, 1999.

2. I had been employed by Nemoto Kyorindo Co., Ltd. since April 1, 1999 and working at the Kawaguchi Factory. I have worked in the field of designing of injector for 9 years.

Dated: May 9, 2008

By: 久澤 亜希夫  
Akio YAZAWA